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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,963	10/21/2003	Ryuichi Saito	2003_1419A	4196

513 7590 04/19/2005

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WASHINGTON, DC 20006-1021

EXAMINER
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ELVE, MARIA ALEXANDRA

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/688,963

Applicant(s)

SAITO ET AL.

Examiner

M. Alexandra Elve

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/21/03</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Oath/Declaration***

It was not executed in accordance with either 37 CFR 1.66 or 1.68.  
The oath was not signed.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (USPN 6,172,330) in view of Smart (USPN 6,281,471)

Yamamoto et al. discloses a method for forming through holes in a ceramic green sheet. The ceramic green sheet has one surface covered with a resin carrier film. Pulse duration is of the order of microseconds to milliseconds. The laser beam output power is of the order of  $10^2$  to  $10^7$  watts. The laser beam output power can be set at 0.4 kilowatts for a pulse duration of 100 microseconds or 5 kilowatts for a pulse duration of 40 microseconds. The ceramic green sheet is preferably formed by applying a slurry of a ceramic powder, a binder to the top surface of a resin carrier film and then blading the film to a desired thickness. A mask is disposed on the top surface of the ceramic green sheet. The mask covers the entire portion of the ceramic green to be processed. Each hole is formed by one single laser shot. Since the pulse duration of the laser beam is of

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the order of microseconds or milliseconds, the formation of a plurality of through holes by a single shot of the laser beam is substantially instantaneous. The carrier film is removed from the ceramic green sheet in a subsequent laminating process for the ceramic green sheet. The spot shape of the laser beam may be any desired shape as long as the energy density of the spot shape is capable of forming through holes and positioning openings. The number and shape of through holes maybe varied; examples include the following: circle, cross, rectangle, triangle, ellipse and so forth. (abstract, figures, col. 3, lines 60-65, col. 4, lines 51-67, col. 5, lines 1-23, col. 6, lines 5-15, col. 7, lines 7-2, col. 8, lines 40-43, col. 10, lines 65-67, col. 11, lines 1-20)

Yamamoto et al. did not teach the use of a square pulse shape. Smart discloses the processing of microstructural materials, specifically links on circuit boards. A pulse train from the laser has a substantially square pulse shape. (abstract, col. 5, lines 60-65, col. 6, lines 37, col. 7, lines 42-48, col. 8, lines 15-42, col. 9, lines 25-32, col. 10, lines 20-50, col. 11, lines 29-35, col. 12, lines 55-62, col. 14, lines 20-52, col. 16, lines 23-41, col. 17, lines 48-55, col. 18, lines 18-58)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a laser with a square shaped pulse for material processing as taught by Smart in the Yamamoto et al. process because of its accurate machining properties, specifically in the formation of vias.

***Conclusion***

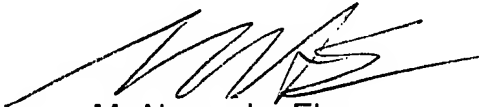
The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See US PTO-892.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 6:30-3:00 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on 571-272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

April 16, 2005.

  
M. Alexandra Elve  
Primary Examiner 1725